Welcome to CS 234

- Instructor: Stefano Lonardi
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  - Email: stelo@cs.ucr.edu
- Lectures: MWF 10-10:50am, Zoom
- Office hours: by appointment (Zoom)
- http://www.cs.ucr.edu/~stelo/
  (click on “Teaching”, then CS 144 Spring 21)
CS 234 Course Format

- 3 Homework
- 1 Project
- 1 Midterm
- 1 Presentation

CS 234 grading

- Homework: 20%
- Midterm: 30%
- Presentation (20 minutes, last two weeks): 30%
- Project: 50% (due final week, ½ hour demo over zoom)
CS 234 Course Overview

• Intro to Molecular biology (DNA/RNA/proteins, replication, transcription, translation, ...)
• Intro to Molecular biology tools (hybridization, digestion, PCR, sequencing, ...)
• String matching (exact and approximate)
• Data structures for exact string matching (hashing, Bloom filters, suffix trees/arrays, BWT)
• Probability and Statistics (parameter estimation, Bernoulli and Markov models, Bayes theorem, entropy)
• Position-specific matrix profiles (relative entropy), hidden Markov models (Viterbi, Baum-Welch), profile HMM
• Biological networks (co-expression networks, gene regulatory network, protein-protein interaction networks, metabolic networks, analysis of networks, random models)

What you will not learn here...

• Molecular biology (if you are really interested in Molecular biology, you should enroll/audit an undergraduate course in molecular biology, e.g., BIOL 107A/B)
• Statistics (same considerations ... consider STAT160A-B, STAT161)
• How to use existing bioinformatics software for molecular biology
If you want to know more about ...

• Algorithms for multiple sequence alignment (local and global)
• Algorithms for fragment assembly
• Algorithms for restriction mapping and multiple digest mapping
• Algorithms for phylogenetic trees reconstruction
  … and more
• “CS 144: Algorithms for Bioinformatics” (new, next quarter)
• “CS 238: Algorithms for Molecular Biology” (next year)

Some useful books
To know more about molecular biology


Bioinformatics (references)


Bioinformatics (references)


Bioinformatics (sequences/probability)


Introduce yourself

• Name
• Department
• PhD/MS/undergraduate (what major)
• Years at UCR
• Research interests